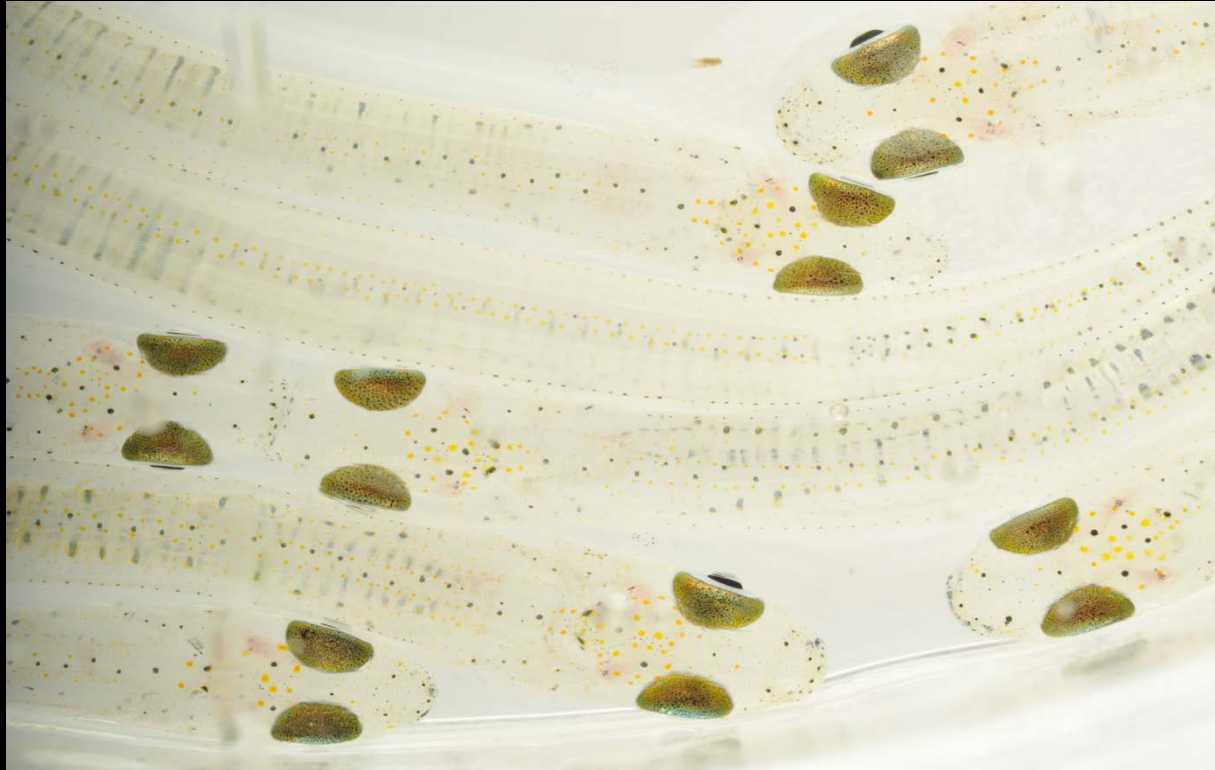


Wandering whitebait: determining the natal source of inanga using otolith microchemistry



Inanga: diadromous and widespread

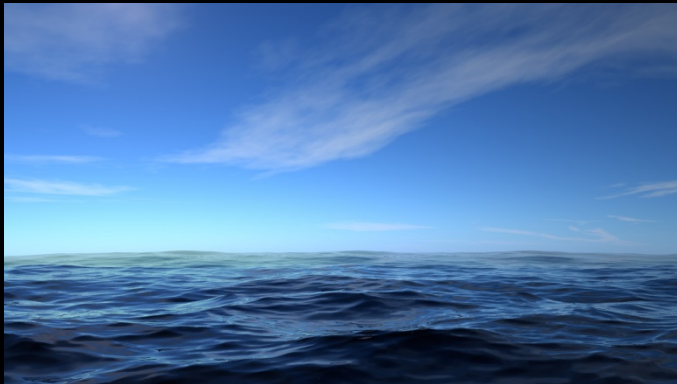


Adults – lowland streams

Spawning - estuarine



Larvae - marine

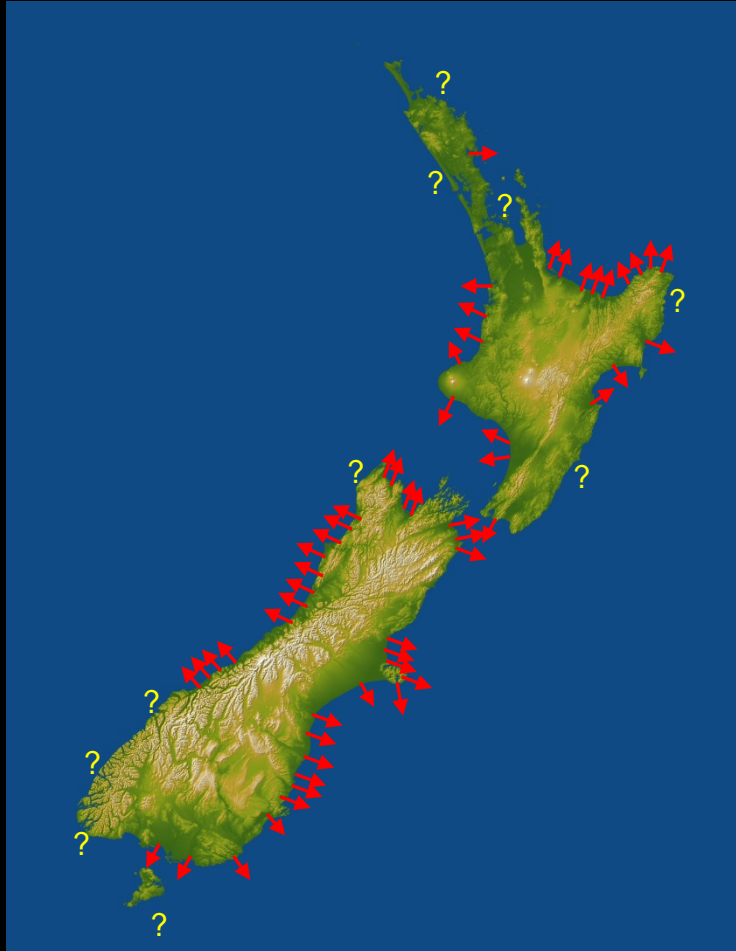


Why do we need to know the source of inanga?

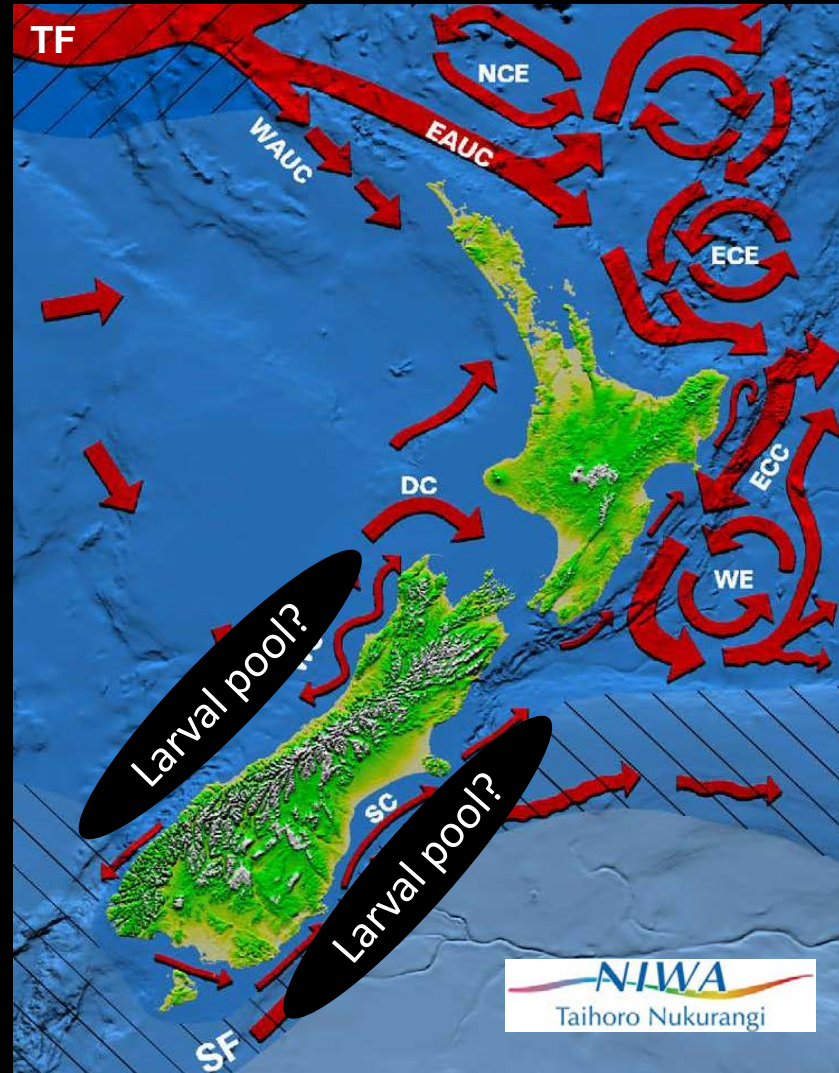
- Threat classification: “At risk – declining”
- Degradation of adult and spawning habitats has formed sink populations
- Where are the source populations?
- Targeted restoration and protection



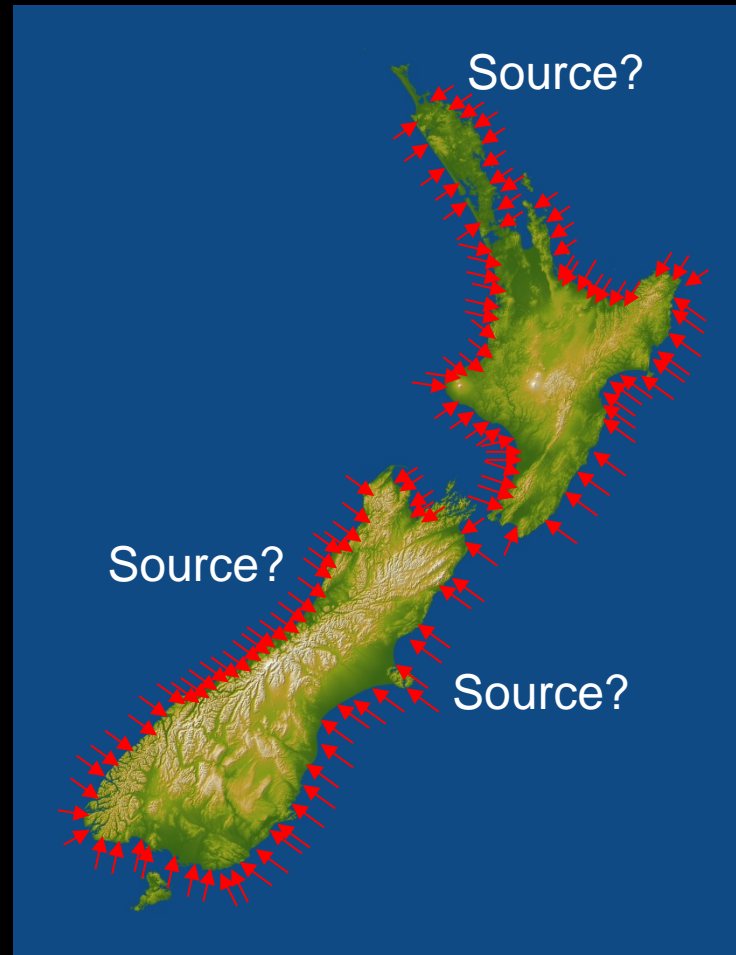
Widespread production of inanga larvae



6 month planktonic phase



Widespread recruitment of Whitebait

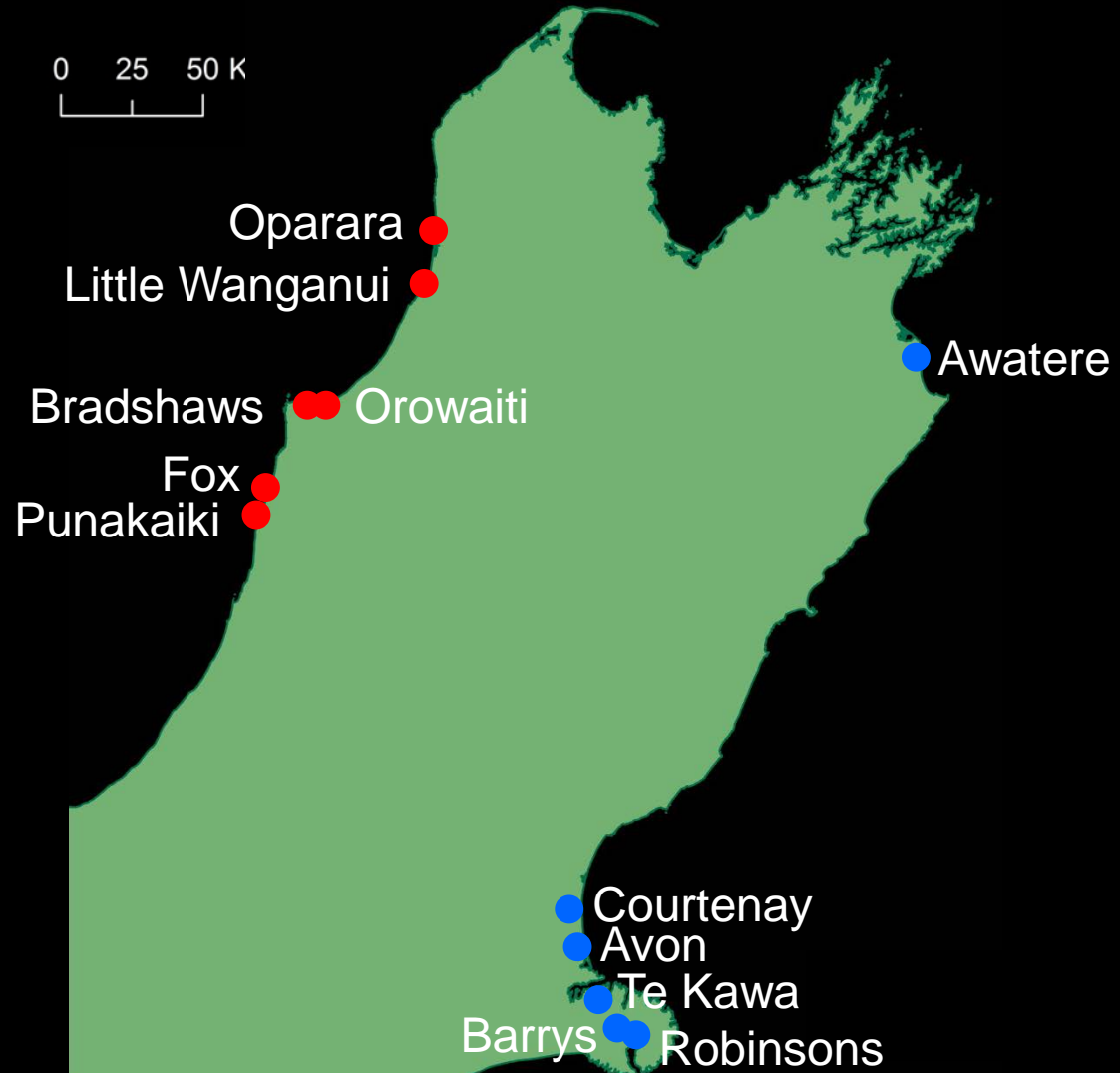


Genetics = homogeneous

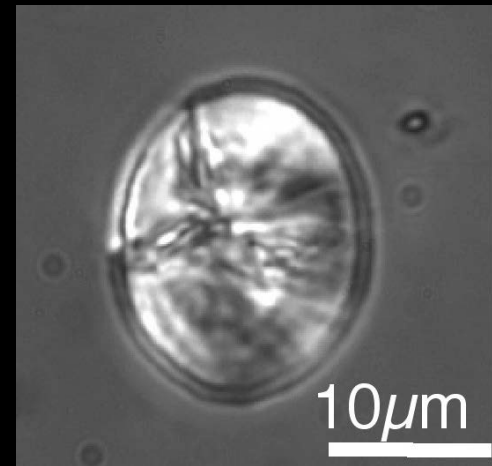
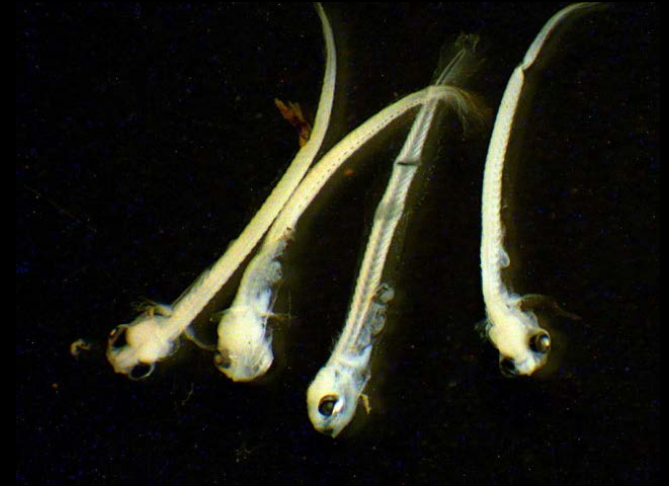
Otolith microchemistry



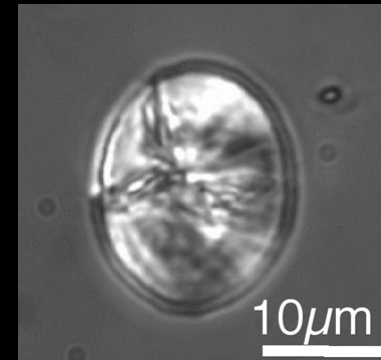
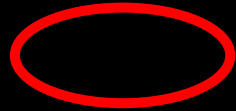
Egg collections (May & June 2009)



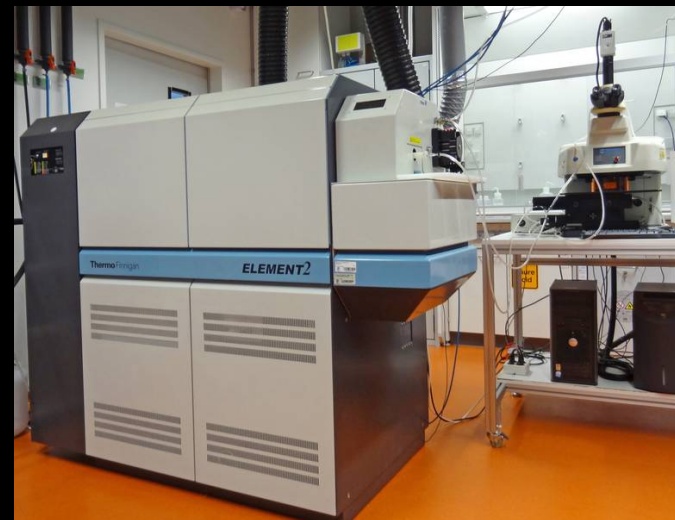
Otoliths removed from hatchlings



Elemental concentrations in whole otolith

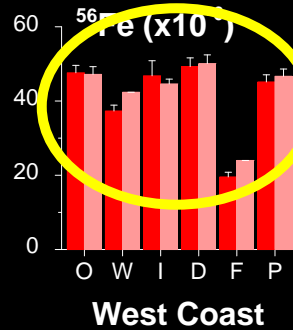


Laser Ablation Inductively Coupled Plasma - Mass Spectrometry



Hatchling single element concentrations

Element concentration (mol/mol Ca⁻¹)



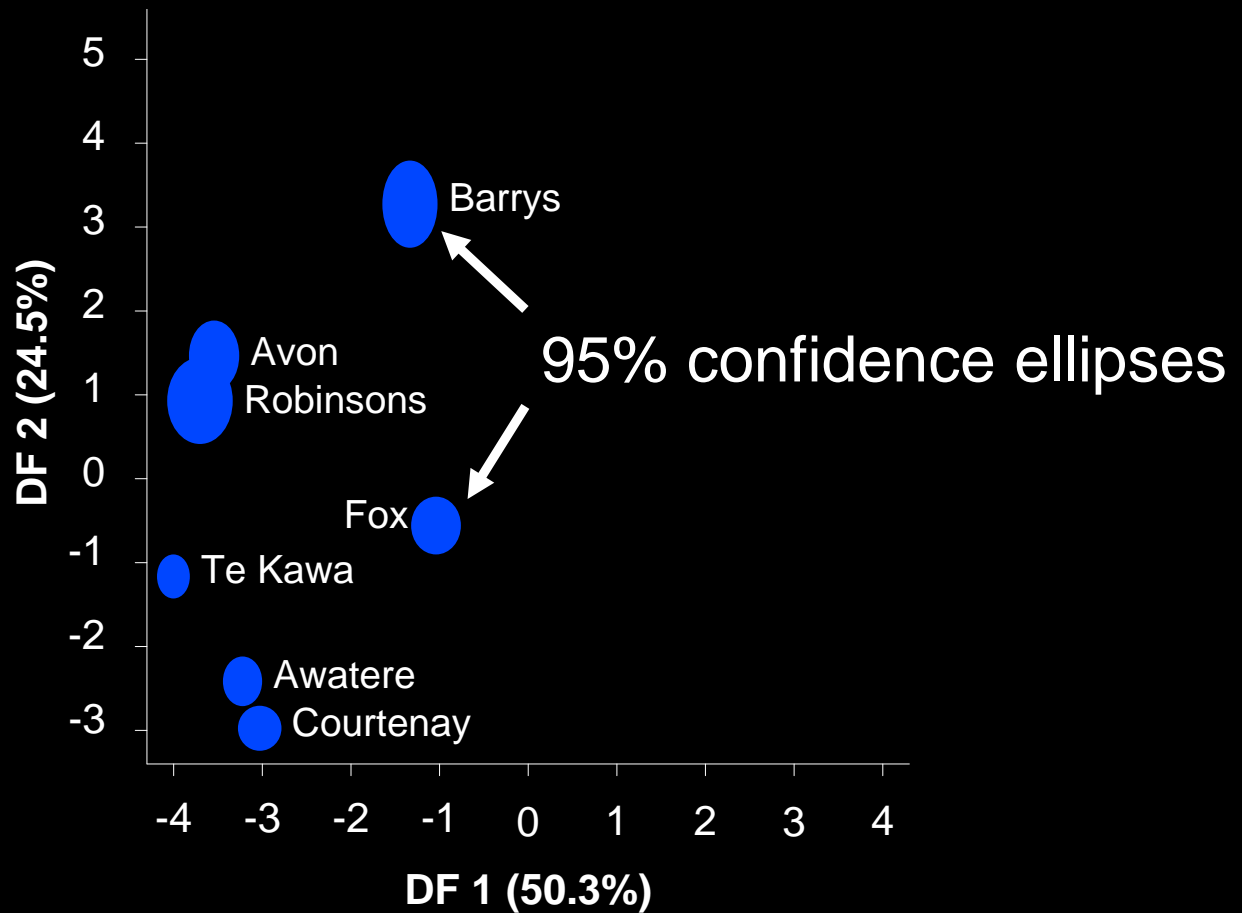
⁵⁶Fe

■ May 2009
■ June 2009

Hatchling multivariate signatures

^{138}Ba
 ^{66}Zn

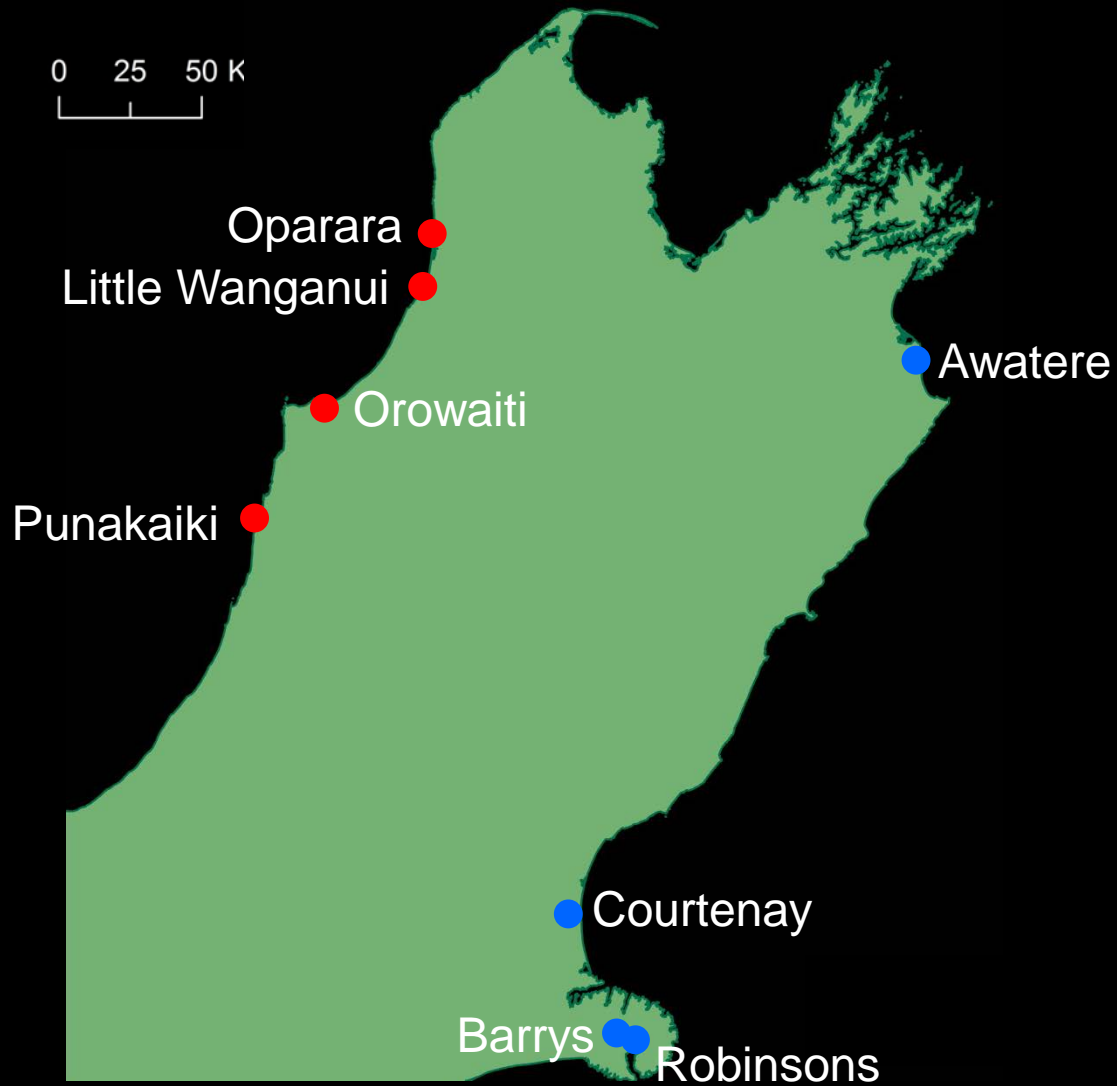
Overall re-classification rate: 85%





6 months later...

Whitebait collections (November 2009)



Elemental signatures at whitebait otolith core



- Discriminant model from hatchling otoliths can be used to classify elemental signature at the core of whitebait otoliths → predict a likely natal origin

West Coast whitebait come from West Coast

High ^{27}Al & ^{56}Fe

Unknown West Coast

Elsewhere

13

12

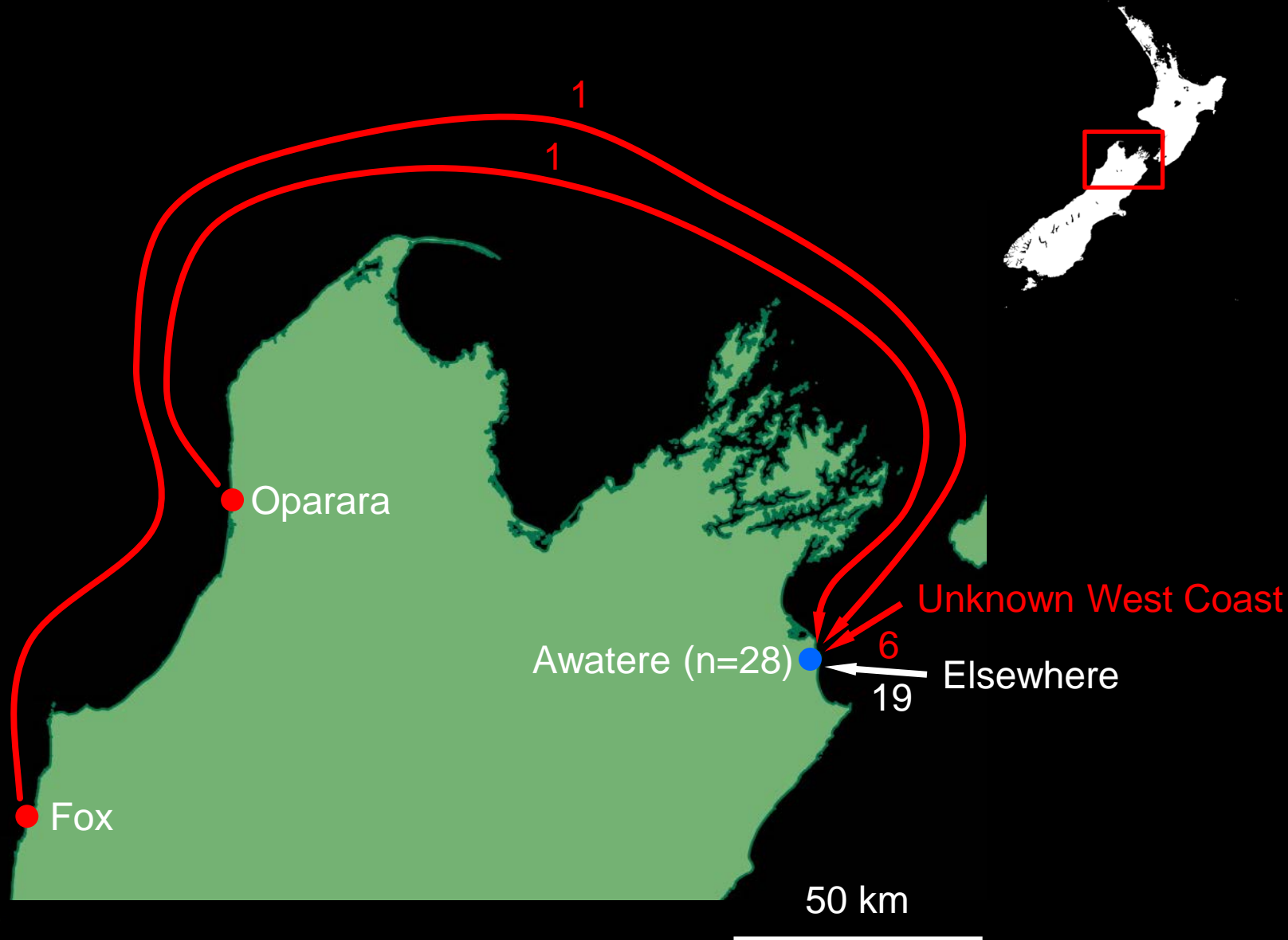
Oparara (n = 29)

Little Wanganui

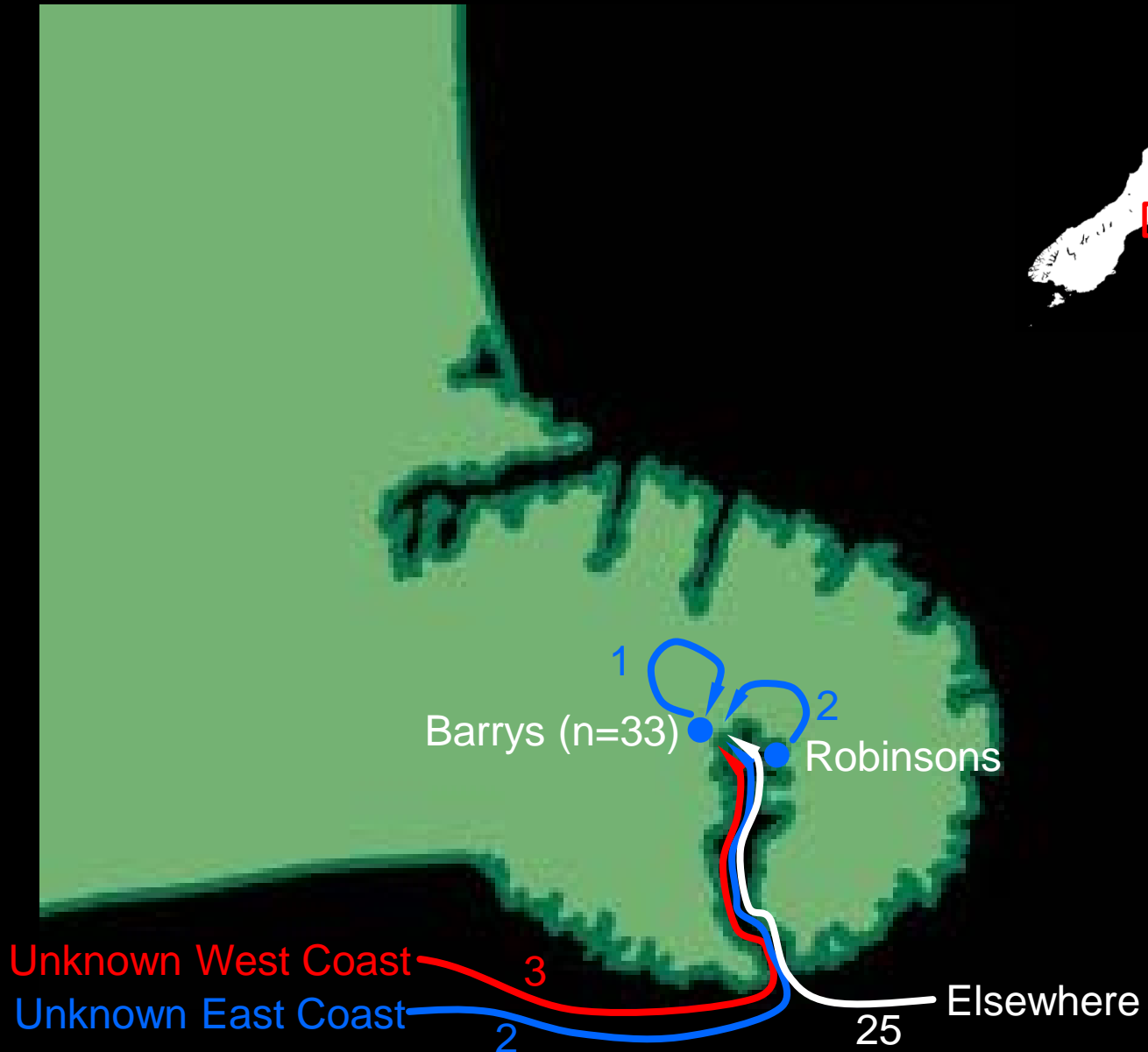
Fox
Punakaiki

50 km

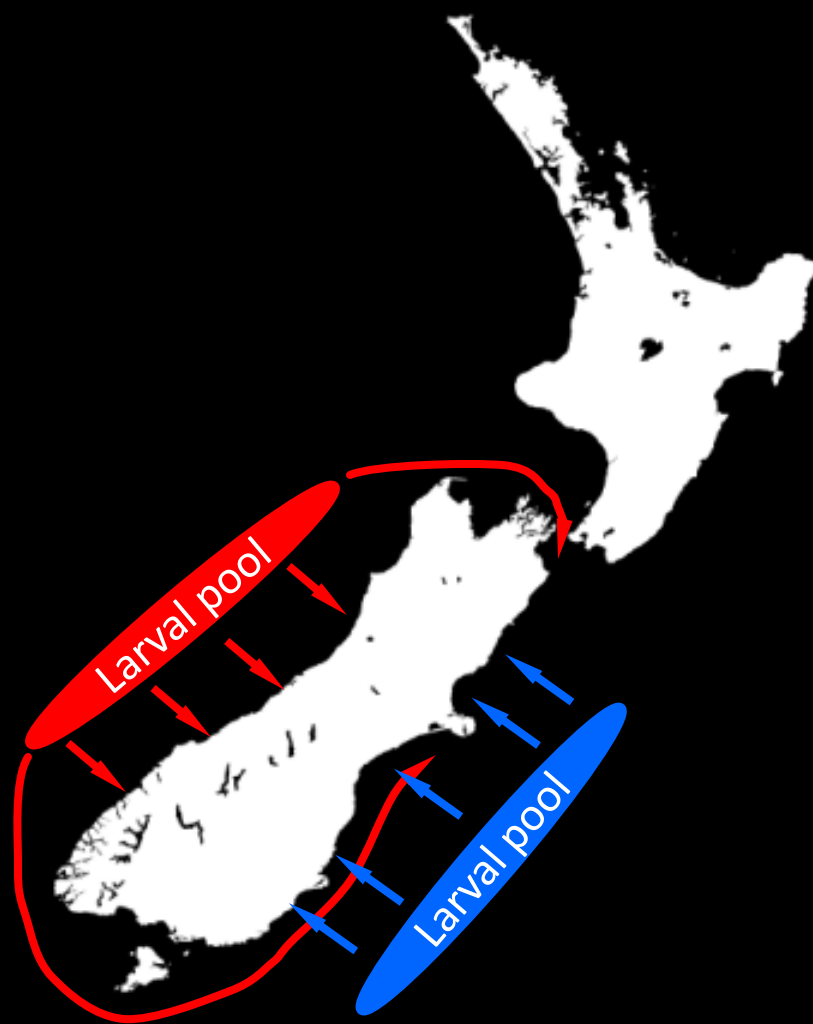
Some East Coast whitebait come from West Coast



Some whitebait are retained locally



Leaky larval pools



Summary

- Inanga show little evidence of natal homing
- Unproductive rivers with degraded spawning habitat still attract whitebait
- No ecological feedback
- Some west coast larvae enter east coast rivers as whitebait
- Modifications to east coast river mouths/spawning habitat may have increased their dependence on the subsidy of whitebait from the west coast

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